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EXAMINER	
WANG, JIN CHENG	
ART UNIT	**PAPER NUMBER**
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/774,315	HAO ET AL.	
	Examiner	Art Unit	
	Jin-Cheng Wang	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2/6/2004.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: on line 3 of claim 11 on Page 17, "to graphical illustrate" should be "to graphically illustrate". Appropriate correction is required.

Claim Objection

The disclosure is objected to because of the following informalities: on line 3 of claim 11, "to graphical illustrate" should be "to graphically illustrate". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 6-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over D. Keim, M. C. Hao, J. Ladisch, M. Hsu, U. Dayal, "Pixel Bar Charts: A New Technique for Visualizing Large Multi-Attribute Data Sets without Aggregation", HP Technical Report, April 11, 2001, pp. 1-10 (hereinafter Keim) in view of B. Shneiderman, "Tree Visualization with Treemaps: a 2-D Space-Filling Approach", ACM Transactions on Graphics, vol. 11, no. 1, pp. 92-99 (hereinafter Shneiderman) and D. Keim, M.C. Hao; U. Dayal; "**Hierarchical pixel bar**

charts", IEEE Trans. On Visualization and Computer Graphics, Vol. 8, No. 3, July-Sept. 2002, pp. 255 – 269 (hereinafter Keim-2002).

Re Claim 1:

Keim discloses a method for presenting data, comprising:

Receiving the data (*e.g., Pages 2-3 of Keim disclose receiving a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors*);

Deriving a multi-level dynamic hierarchical structure (*e.g., Figs. 9-10 and Page 8-9 demonstrated the pixel bar charts for the multi-dimensional data records with multiple attributes wherein each multi-level bar chart corresponds to a hierarchical structure*) for the data based on drilldown sequences input from a user (*e.g., layered drill-down/detail-on-demand as disclosed in page 7 and interactive data exploration and each customer's detail information can be drilled down as needed in Page 9*), wherein the drilldown sequences automatically compute a graphical visual comparison of the data and comprise:

Deriving a multi-pixel bar chart to display an aggregated distribution paradigm (*e.g., Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each bar chart displaying an aggregated distribution paradigm of data records*); and

Driving a graphical illustration to display a data distribution paradigm (*e.g., Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each bar chart reflects the data distribution in the pixel placement algorithm wherein data partitioning is based on the data histograms* ***and data distributions according to the coloring clusters and trends are illustrated therein****; see Page 6*).

Although Keim does not expressly disclose "hierarchical structure", Keim discloses multi-level pixel bar charts as corresponding to the hierarchical structure of data records.

Nevertheless, Shneiderman discloses a multi-level tree structure (hierarchical structure) in Fig. 1, which is also called the tree-like layouts of the hierarchical structures and a tree-map (pixel bar charts).

Keim-2002 discloses hierarchical pixel bar charts to exploit the hierarchy and split the bars for selected portions of the hierarchy to show more detailed information for the selected portion of the data (Section 3.3 on Page 258). Keim-2002 discloses in Fig. 8(b) a data distribution paradigm. Moreover, Keim-2002 discloses in Fig. 8(b) the claim limitation of deriving a multi-level dynamic hierarchical structure (Section 3.3 of Keim-2002) for the data based on drilldown sequences input from a user by the *layered drill-down/detail-on-demand as disclosed and interactive data exploration and each customer's detail information can be drilled down as needed wherein the interactive selection allows the user to drill-down to see more details for interesting subsets of the data (Section 3.3 of Keim-2002)*, wherein the drilldown sequences automatically compute a graphical visual comparison of the data and comprise: deriving a multi-pixel bar chart to display an aggregated distribution paradigm and driving a

graphical illustration to display a data distribution paradigm (**Page 258 and Section 3.3 and Fig. 7(b), Fig. 8(b)**).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to have incorporated Shneiderman or Keim-2002 into Keim's teaching because in Keim the pixel array ordering and grouping correspond to the data record ordering and grouping. Therefore, the pixel array as representing a multi-level hierarchical structure also shows that the data record array as representing a multi-level hierarchical structure as there is a one-to-one correspondence between the pixel in the pixel array and a data record in the plurality of data records.

Having the teaching of Shneiderman/Keim-2002 as incorporated into Keim, one of the ordinary skill in the art would have been motivated to visualize large volumes of multi-attribute data sets to explore and interpret the pixel bar chart system (**Keim Section 4.2 and Keim-2002 Section 3.3 and Figs. 7(b) and 8(b)**).

Re Claim 2:

The claim 2 encompasses the same scope of invention as that of the claim 1 except additional claim limitation the graphical illustration being a multi-pixel bar chart. However, Keim further discloses the claim limitation the graphical illustration being a multi-pixel bar chart (*e.g., Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts or the multiple linked pixel bars of Page 7*).

Re Claim 3:

The claim 3 encompasses the same scope of invention as that of the claim 1 except additional claim limitation drilling down from the multi-level hierarchical structure to display both the aggregated data paradigm and the data distribution paradigm. However, Keim further discloses the drilling down from the multi-level hierarchical structure to display both the aggregated data paradigm and the data distribution paradigm (*e.g., Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each of them displaying an aggregated distribution paradigm of data records; see Section 2 of Page 2 wherein data distributions based on histograms are disclosed*). Keim-2002 discloses in Section 5.3 the drilling down from the multi-level hierarchical structure to display both the aggregated data paradigm and the data distribution paradigm.

Re Claim 6:

The claim 6 encompasses the same scope of invention as that of the claim 1 except additional claim limitation inputting preferences from the user for a plurality of different levels of the multi-level hierarchical structure.

However, Keim further discloses the claim limitation inputting preferences from the user for a plurality of different levels of the multi-level hierarchical structure (*e.g., the portioning algorithm assigns each data record to the corresponding bar according to the partitioning attributes and the attributes used for portioning, ordering and coloring can be selected and changed at execution time of Section 4.2*). Keim-2002 discloses in Section 5.3 and Fig. 7(b) inputting preferences from the user for a plurality of different levels of the multi-level hierarchical structure.

Re Claim 7:

The claim 7 encompasses the same scope of invention as that of the claim 1 except additional claim limitation deriving a multi-pixel bar chart further comprises ordering a plurality of bars according to product ranking.

However, Keim further discloses the claim limitation deriving a multi-pixel bar chart further comprises ordering a plurality of bars according to product ranking (*e.g., Fig. 6 shows dividing attributes on x-axis being the product ranking/ordering according to the product type*). Keim-2002 discloses in Section 3.3, 5.3 and Fig. 8(b) ordering a plurality of bars according to product ranking.

Re Claim 8:

The claim 8 encompasses the same scope of invention as that of the claim 7 except additional claim limitation arranging three consecutive bars to have a highest ranking and arranging three consecutive bars to have a lowest ranking.

However, Keim further discloses the claim limitation arranging three consecutive bars to have a highest ranking and arranging three consecutive bars to have a lowest ranking (*e.g., Figs. 4 and 6 shows dividing attributes on x-axis being the product ranking/ordering according to the product type wherein Fig. 4 shows the three-consecutive bars of the highest ranking and the three-consecutive bars of the lowest ranking*). Keim-2002 discloses in Section 5.3 and Fig. 8(b) arranging three consecutive bars to have a highest ranking and arranging three consecutive bars to have a lowest ranking as arranged in the pixel bar chart.

Re Claim 9:

The claim 9 encompasses the same scope of invention as that of the claim 1 except additional claim limitation coloring pixels green and coloring pixels red and the green pixels representing higher sales than the red pixels.

However, Keim further discloses the claim limitation coloring pixels green and coloring pixels red and the green pixels representing higher sales than the red pixels (*e.g., Fig. 10 shows the coloring of pixels to green or red and dark colors representing higher sales*). Keim-2002 discloses in Section 5.3 and Fig. 8(b) coloring pixels green and coloring pixels red and the green pixels representing higher sales than the red pixels.

Re Claim 10:

Preamble is not given patentable weight, since it only recites a summary of the claim and/or an intended use, and the process steps and/or apparatus components are capable of standing on their own; see Rowe v. Dror, 112 F. 3d 473, 42 USPQ2d 1550 (Fed. Cir. 1997), Pitney Bowes, Inc. v. Hewlett-Packward Co., 182 F. 3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999), and the like.

Keim discloses:

Determining a set of attributes for placement of the data in a graphically displayable array comprising a plurality of pixels with each pixel encoded with a portion of the data (*e.g., Pages 2-*

3 of Keim disclose receiving a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors);

Arranging the pixels into the graphical displayable array to illustrate both an aggregated data paradigm and a data distribution paradigm (*e.g., Figs. 9-10 and Page 8-9 demonstrated the pixel bar charts for the multi-dimensional data records with multiple attributes wherein each multi-level bar chart corresponds to a hierarchical structure* wherein *layered drill-down/detail-on-demand as disclosed in page 7 and interactive data exploration and each customer's detail information can be drilled down as needed in Page 9. The Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each bar chart displaying an aggregated distribution paradigm of data records; The Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each bar chart reflects the data distribution in the pixel placement algorithm wherein data partitioning is based on the data histograms* ***and data distributions according to the coloring clusters and trends are illustrated therein****; see Page 6*).

Although Keim does not expressly disclose "data distribution paradigm", Keim discloses multi-level pixel bar charts as corresponding to the hierarchical structure of data records.

Nevertheless, Shneiderman discloses a multi-level tree structure (hierarchical structure) in Fig. 1, which is also called the tree-like layouts of the hierarchical structures and a tree-map (pixel bar charts) wherein the data records are distributed in a tree-like structure.

Keim-2002 discloses hierarchical pixel bar charts to exploit the hierarchy and split the bars for selected portions of the hierarchy to show more detailed information for the selected portion of the data (Section 3.3 on Page 258). Keim-2002 discloses in Fig. 8(b), in a different setting, a data distribution paradigm. Moreover, Keim-2002 discloses in Fig. 8(b) the claim limitation of deriving a multi-level dynamic hierarchical structure (Section 3.3 of Keim-2002) for the data based on drilldown sequences input from a user by the *layered drill-down/detail-on-demand as disclosed and interactive data exploration and each customer's detail information can be drilled down as needed wherein the interactive selection allows the user to drill-down to see more details for interesting subsets of the data (Section 3.3 of Keim-2002)*, wherein the drilldown sequences automatically compute a graphical visual comparison of the data and comprise: deriving a multi-pixel bar chart to display an aggregated distribution paradigm and driving a graphical illustration to display a data distribution paradigm (**Page 258 and Section 3.3 and Fig. 7(b), Fig. 8(b)**).

It would have been obvious to one of the ordinary skill in the art to have incorporated Shneiderman or Keim-2002 into Keim's teaching because in Keim the pixel array ordering and grouping correspond to the data record ordering and grouping. Therefore, the pixel array as representing a multi-level hierarchical structure also shows that the data record array as representing a multi-level hierarchical structure as there is a one-to-one correspondence between the pixel in the pixel array and a data record in the plurality of data records.

Having the teaching of Shneiderman/Keim-2002 as incorporated into Keim, one of the ordinary skill in the art would have been motivated to visualize large volumes of multi-attribute

data sets to explore and interpret the pixel bar chart system (**Keim Section 4.2 and Keim-2002 Section 3.3 and Figs. 7(b) and 8(b)**).

Re Claim 11:

The claim 11 encompasses the same scope of invention as that of the claim 10 except additional claim limitation constructing a multi-level hierarchical tree having a plurality of different levels to graphically illustrate at least a portion of the data.

However, Keim further discloses constructing a multi-level hierarchical tree having a plurality of different levels to graphically illustrate at least a portion of the data (*e.g., Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each pixel bar charts having a multi-level hierarchical structure*).

Re Claim 12:

The claim 12 encompasses the same scope of invention as that of the claim 10 except additional claim limitation the graphically displayable array comprises an X-axis and a Y-axis.

However, Keim further discloses the claim limitation the graphically displayable array comprises an X-axis and a Y-axis (*e.g., Figs. 2. 6 9-10 wherein the pixel bar charts comprise an X-axis and a Y-axis).*

Re Claim 13:

The claim 13 encompasses the same scope of invention as that of the claim 12 except additional claim limitation the X-axis representing a data category and the Y-axis representing a data value.

However, Keim further discloses the claim limitation the X-axis representing a data category and the Y-axis representing a data value (*e.g., Figs. 2. 6 9-10 wherein the pixel bar charts comprise an X-axis and a Y-axis wherein the X-axis represents the product type and the Y-axis represents dollar amount).*

Re Claim 14:

The claim 14 encompasses the same scope of invention as that of the claim 10 except additional claim limitation each pixel is encoded with a color.

However, Keim further discloses the claim limitation each pixel is encoded with a color (*e.g., Figs. 2. 6 9-10 wherein each pixel is encoded with color such as the coloring for the region, quantity, dollar amount or the no. of visits).*

Re Claim 15:

The claim 15 encompasses the same scope of invention as that of the claim 14 except additional claim limitation the pixels are encoded with a plurality of different colors.

However, Keim further discloses the claim limitation the pixels are encoded with a plurality of different colors (*e.g., Figs. 2. 6, 9-10 wherein pixels are illustrated with darker colors or light colors).*

Re Claim 16:

Keim discloses a computer system (Section 4), comprising:

A bus (Section 4 and Fig. 8 disclosing a bus between the Client and Server);

A display device coupled to the bus (*a display displaying HTML pages in a web browser; in Section 4 and Fig. 8*);

A computer-readable memory coupled to the bus (*Section 4*); and

A processor coupled to the bus (*Section 4 and Fig. 8 wherein the server has a processor executing the data visualization for the pixel bar charts*), the processor executing code for:

Receiving the data (*e.g., Pages 2-3 of Keim disclose receiving a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors*);

Deriving a multi-level dynamic hierarchical structure (*e.g., Figs. 9-10 and Page 8-9 demonstrated the pixel bar charts for the multi-dimensional data records with multiple attributes wherein each multi-level bar chart corresponds to a hierarchical structure*) for the data based on preferences input from a user (*e.g., layered drill-down/detail-on-demand as disclosed in page 7 and interactive data exploration and each customer's detail information can be drilled down as needed in Page 9 and the portioning algorithm assigns each data record to the corresponding bar according to the partitioning attributes and the attributes used for portioning, ordering and coloring can be selected and changed at execution time of Section 4.2*);

Navigating through the multi-level dynamic hierarchical structure using drilldown sequences input from the user, the drilldown sequences automatically computing at least one of a graphical illustration to display an aggregated data paradigm (*e.g., Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each bar chart displaying an aggregated distribution paradigm of data records*) and a graphical illustration to display a data distribution paradigm (*e.g., Figs. 9-10 and Page 8-9 illustrated a plurality of multi-pixel bar charts with each bar chart reflects the data distribution in the pixel placement algorithm wherein data partitioning is based on the data histograms* ***and data distributions according to the coloring clusters and trends are illustrated therein****; see Page 6*).

Although Keim does not expressly disclose "hierarchical structure", Keim discloses multi-level pixel bar charts as corresponding to the hierarchical structure of data records.

Nevertheless, Shneiderman discloses a multi-level tree structure (hierarchical structure) in Fig. 1, which is also called the tree-like layouts of the hierarchical structures and a tree-map (pixel bar charts).

Keim-2002 discloses hierarchical pixel bar charts to exploit the hierarchy and split the bars for selected portions of the hierarchy to show more detailed information for the selected portion of the data (Section 3.3 on Page 258). Keim-2002 discloses in Fig. 8(b), in a different setting, a data distribution paradigm. Moreover, Keim-2002 discloses in Fig. 8(b) the claim limitation of deriving a multi-level dynamic hierarchical structure (Section 3.3 of Keim-2002) for the data based on drilldown sequences input from a user by the *layered drill-down/detail-on-demand as disclosed and interactive data exploration and each customer's detail information can be drilled down as needed wherein the interactive selection allows the user to drill-down to*

see more details for interesting subsets of the data (Section 3.3 of Keim-2002), wherein the drilldown sequences automatically compute a graphical visual comparison of the data and comprise: deriving a multi-pixel bar chart to display an aggregated distribution paradigm and driving a graphical illustration to display a data distribution paradigm (**Page 258 and Section 3.3 and Fig. 7(b), Fig. 8(b)**).

It would have been obvious to one of the ordinary skill in the art to have incorporated Shneiderman or Keim-2002 into Keim's teaching because in Keim the pixel array ordering and grouping correspond to the data record ordering and grouping. Therefore, the pixel array as representing a multi-level hierarchical structure also shows that the data record array as representing a multi-level hierarchical structure as there is a one-to-one correspondence between the pixel in the pixel array and a data record in the plurality of data records.

Having the teaching of Shneiderman/Keim-2002 as incorporated into Keim, one of the ordinary skill in the art would have been motivated to visualize large volumes of multi-attribute data sets to explore and interpret the pixel bar chart system (Keim Section 4.2 and Keim-2002 Section 3.3).

Re Claim 17:

The claim 17 encompasses the same scope of invention as that of the claim 16 except additional claim limitation the graphical illustration to display an aggregated data paradigm is based on attributes from a previous hierarchical level.

However, Keim further discloses the claim limitation inputting the graphical illustration to display an aggregated data paradigm is based on attributes from a previous hierarchical level

(*e.g., Section 4.2 discloses layered drill-down and detail-on-demand and multiple linked visualization allows the viewing of all related information after selecting a single data item*).

Re Claim 18:

The claim 18 encompasses the same scope of invention as that of the claim 16 except additional claim limitation the data distribution paradigm provides a chart with multiple colors to visually signify changes in data distribution at a record level.

However, Keim further discloses the claim limitation the data distribution paradigm provides a chart with multiple colors to visually signify changes in data distribution at a record level (*e.g., Fig. 10 shows the coloring of pixels to green or red and dark colors representing higher sales* ***and data distributions according to the coloring clusters and trends are illustrated therein****; see Page 6*).

Re Claim 20:

The claim 20 encompasses the same scope of invention as that of the claim 16 except additional claim limitation the data distribution paradigm comprises over one million data records.

However, Keim further discloses the claim limitation the data distribution paradigm comprises over one million data records (*e.g., Fig. 9 and Page 7 disclose 106,199 customer buying records*).

Claims 4-5 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over D. Keim, M. C. Hao, J. Ladisch, M. Hsu, U. Dayal, "Pixel Bar Charts: A New Technique for Visualizing Large Multi-Attribute Data Sets without Aggregation", HP Technical Report, April

11, 2001, pp. 1-10 (hereinafter Keim) in view of B. Shneiderman, "Tree Visualization with Treemaps: a 2-D Space-Filling Approach", ACM Transactions on Graphics, vol. 11, no. 1, pp. 92-99 (hereinafter Shneiderman), D. Keim, M.C. Hao; U. Dayal; "**Hierarchical pixel bar charts",** IEEE Trans. On Visualization and Computer Graphics, Vol. 8, No. 3, July-Sept. 2002, pp. 255 – 269 (hereinafter Keim-2002) and Friedman et al. U.S. Patent No. 5,893,090 (hereinafter Friedman).

Re Claim 4:

The claim 4 encompasses the same scope of invention as that of the claim 1 except additional claim limitation that deriving a graphical illustration further comprises providing a comparison of product sales with average product sales to derive a difference in product sales.

Although Keim does not expressly disclose, "providing a comparison of product sales with average product sales to derive a difference in product sales", Keim discloses the ordering and partitioning attribute with the ordering and partitioning attribute including the difference between each of the product sales and average product sales wherein the comparison is performed by the clustered colored pixels. Keim's Figs. 9-10 uses the height of a bar to show the average or aggregated value.

Keim-2002 discloses thresholding interaction on Page 264 wherein the user can define a threshold to identify the areas that exceed a value, for example, the areas above the threshold are colored red. Moreover, Keim-2002 also discloses pixel bar charts employing **average/median lines** that separates a bar into two parts with the upper part of the data exceeds the average/median value and the lower part of the data being below the average/median value

(Keim-2002 Fig. 12a). Keim-2002 has disclosed the claim limitation of comparison in the pixel bar chart.

Friedman discloses the querying of data records and calculating the average from the data records and thus the difference between each of the product sales of the data records and the average product sales of the data records are calculated by querying statement (See Friedman column 4, lines 50-60 and column 6, lines 1-38). One of the ordinary skill in the art knows that the querying statement for the data records includes providing a comparison of product sales with average product sales to derive a difference in product sales.

It would have been obvious to one of the ordinary skill in the art to have modified Keim, Keim-2002 and Shneiderman's teaching and to have incorporated Friedman's teaching into Keim, Keim-2002 and Shneiderman because in Keim's pixel array ordering and grouping may be selected in accordance to the recalculated/renormalized product sales from the data records such that the product sale for each individual data record as being the original product sale minus the average product sale and such calculation is enabled by the querying statement according to the teaching of Friedman.

One of the ordinary skill in the art would have been motivated to visualize large volumes of multi-attribute data sets to explore and interpret the pixel bar chart system based on an ordering and partitioning attribute based on the querying statement (Keim Section 4.2).

Re Claim 5:

The claim 5 encompasses the same scope of invention as that of the claim 1 except additional claim limitation of deriving standard deviations between a plurality of products.

Although Keim does not expressly disclose of deriving standard deviations between a plurality of products, Keim discloses the ordering and partitioning attribute with the ordering and partitioning attribute including the standard deviation between a plurality of products.

Friedman discloses the querying of data records and calculating the standard deviation from the data records and thus the standard deviations are calculated by querying statement for the data records (See Friedman column 4, lines 50-60 and column 6, lines 1-38). One of the ordinary skill in the art knows that the querying statement for the data records includes providing the deviation between a plurality of products from the data records.

It would have been obvious to one of the ordinary skill in the art to have modified Keim, Keim-2002 and Shneiderman's teaching and to have incorporated Friedman's teaching into Keim, Keim-2002 and Shneiderman because in Keim's pixel array ordering and grouping may be selected in accordance to the standard deviation of the data records and such calculation is enabled by the querying statement according to the teaching of Friedman. Keim teaches the interactive data exploration and visual querying and thus suggesting querying the standard deviation of the data records.

One of the ordinary skill in the art would have been motivated to visualize large volumes of multi-attribute data sets to explore and interpret the pixel bar chart system based on an ordering and partitioning attribute for analyzing the patterns, correlations and trends (Keim Section 2 and Section 4.2) by the querying statement.

Re Claim 19:

The claim 19 encompasses the same scope of invention as that of the claim 16 except additional claim limitation that deriving a graphical illustration further comprises providing a comparison of dollar amount of product sales with a dollar amount of average product sales.

Although Keim does not expressly disclose, "deriving a graphical illustration further comprises providing a comparison of dollar amount of product sales with a dollar amount of average product sales", Keim discloses the ordering and partitioning attribute wherein the ordering and partitioning attribute may be dollar amount of product sales or a dollar amount of average product sales.

Keim-2002 discloses thresholding interaction on Page 264 wherein the user can define a threshold to identify the areas that exceed a value, for example, the areas above the threshold are colored red. Moreover, Keim-2002 also discloses pixel bar charts employing average/median lines that separates a bar into two parts with the upper part of the data exceeds the average/median value and the lower part of the data being below the average/median value (Keim-2002 Fig. 12a) and thus Keim-2002's hierarchical pixel bar charts provide a comparison of dollar amount of product sales with a dollar amount of average product sales when applied to the product sales transaction data records of Keim. Keim-2002 has disclosed the claim limitation of comparison in the pixel bar chart.

Friedman discloses the querying of data records and calculating the average from the data records and the average product sales of the data records are calculated by querying statement (See Friedman column 4, lines 50-60 and column 6, lines 1-38). One of the ordinary skill in the art knows that the querying statement for the data records include providing a comparison of dollar amount of product sales with a dollar amount of average product sales.

It would have been obvious to one of the ordinary skill in the art to have modified Keim, Keim-2002 and Shneiderman's teaching and to have incorporated Friedman's teaching into Keim, Keim-2002 and Shneiderman because Keim's pixel array ordering and grouping may be selected in accordance to the dollar amount of product sales or a dollar amount of average product sales and the aggregate querying is enabled by the querying statement according to the teaching of Friedman.

One of the ordinary skill in the art would have been motivated to visualize large volumes of multi-attribute data sets to explore and interpret the pixel bar chart system based on an ordering and partitioning attribute by the visual querying (Keim Section 4.2 and Keim-2002 Section 5.2).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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